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Significance of Human Development, Labor Participation, and Unemployment in Driving Regional Economic Growth

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ABSTRACT
East Java Province stands as the second largest contributor to Indonesia's economy, driven by its strong industrial, trade, and agricultural sectors. However, disparities in human development and labor market dynamics persist across regions. This study aims to investigate the effects of the Human Development Index (HDI), Labor Force Participation Rate (LFPR), and Open Unemployment Rate (OUR) on regional economic growth in East Java during 2017–2023. Using panel data regression from 38 regencies/cities and applying the Common Effect Model with robust standard errors, the findings reveal that HDI positively and significantly influences economic growth, reflecting the pivotal role of human capital. In contrast, LFPR and OUR both show significant negative effects, suggesting that labor participation without quality employment and high unemployment undermine economic performance. These results imply that merely increasing labor participation is insufficient without parallel improvements in job quality, economic diversification, and workforce productivity. The study contributes to regional development literature by highlighting the nuanced interplay between human development and labor market indicators. The findings offer valuable insights for policymakers to prioritize inclusive human resource development, reduce unemployment, and enhance the quality of labor market absorption to foster sustainable economic growth.

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1. Introduction

East Java Province is the second largest contributor to the Indonesian economy, with the same growth rate as the national and other major provinces on the island of Java (Muhammad Alfin Syaiful Izza et al., 2023). In 2019, East Java was still in this rank, with three leading sectors in the Gross Regional Domestic Product (GRDP): the manufacturing industry sector (29.03%), trade (18.18%), and agriculture (12.80%) (Assidikiyah et al., 2021). These sectors reflect the province's economic backbone and have shown consistency in driving regional growth over the years. At the same time, MSMEs became a resilient economic pillar, generating jobs and income despite capital and technology constraints (Bartik et al., 2020; Cowling et al., 2020; Juergensen et al., 2020; Shafi et al., 2020).

One of the factors of economic growth can be seen from the Human Development Index (HDI), which reflects the quality of human resources in East Java. Higher HDI values are associated with better access to education and health services, which strengthen human capital and enhance resilience in sustaining long-term regional growth (Liu & Liang, 2025; Magida et al., 2025; Pontoh et al., 2024; Suryani & Rudy Rinaldy, 2023). According to the latest data, the HDI of East Java has kept on rising, driven by the increase in life expectancy at birth, mean years of schooling, and purchasing power per household. Increasing HDI also reflects the effectiveness of different policies of the local government in promoting sustainable development and public welfare. This effectiveness is largely determined by the institutional capacities of local governments—strategic, analytical, managerial, and collaborative—which enable them to design, implement, and evaluate sustainable development policies consistently (Salvador & Sancho, 2021; Wang et al., 2014; Wu et al., 2018)

GRDP growth is also shaped by the labor force, as the availability of productive human capital strengthens the foundations of various economic sectors and drives their continuous expansion. Empirical evidence shows that the expansion of the labor force, when supported by education and sectoral absorption capacity, significantly stimulates output growth across the economy (Malau et al., 2022). Sasongko et al. (2019) assert that labor force participation is shaped by economic conditions and demographic characteristics, which together influence its long-term contribution to growth. The quality and size of the labor force can boost productivity levels and spur the advancement of industrial, trade, and agricultural sectors, which are the largest contributors to East Java's GRDP (Cai, 2010; Mehrotra & Parida, 2017). A high rate of labor force participation can increase economic production, as a more significant labor force can propel various sectors of the economy, ranging from manufacturing to services. Moreover, with more workers, household income increases, leading to higher purchasing power and consumption, hence a virtuous cycle of economic development (Buswell et al., 2012; Chandola et al., 2019; Guo et al., 2025). A high rate of labor force participation also leads to economic diversification and productivity.

The other important consideration that needs to be considered is the impact of the unemployment rate on economic growth (Amin et al., 2023). A high unemployment rate can retard the growth of GRDP through the decline in purchasing power of the household and labor productivity. This adverse effect is intensified by productivity losses from labour turnover and early retirements, which further weaken firms' output capacity (Cederlöf et al., 2025; Vandenberghe, 2025). A high unemployment rate can retard the growth of GRDP through the decline in household purchasing power and labor productivity, and this adverse effect is further intensified when unemployment interacts with regional poverty, thereby weakening the positive influence of competitiveness factors such as infrastructure, human capital, and institutional quality on GRDP performance (Beverly et al., 2025; Floerkemeier et al., 2021; Sinaga, 2020; Suparta, 2025). Conversely, when unemployment is reduced through the creation of quality jobs, there would be an increase in consumption, investment, and economic activity altogether. Policies like working time reduction and public investment can foster full employment and sustain aggregate demand (D'Alessandro et al., 2020; Jackson & Victor, 2020; Oberholzer, 2023). Thus, strengthening household purchasing power, improving credit access, and fostering MSME growth through measures such as workforce training and innovation support are vital strategies for sustaining job creation and long-term economic stability (Dewaelheyns et al., 2021; Jackson & Victor, 2020; Silvia et al., 2025).

Research on regional economic growth has extensively highlighted the key factors contributing to Gross Regional Domestic Product (GRDP). One of the most common factors analyzed is the Human Development Index (HDI), an indicator of the quality of human resources in a region. The earlier research also indicated that an increase in HDI, which encompasses health, education, and living standards, has a positive impact on economic growth as it enhances workers' productivity and households' buying power. Additionally, an efficient workforce is also one of the key drivers of the development of the industrial, trade, and agricultural sectors. The investment in the quality of the workforce, either through training or education, can lead to increased productivity and stimulate sustainable economic growth. Excessive unemployment, on the other hand, can adversely affect the economy,

Based on the description of the above background, the issue in this research is whether the Human Development Index (HDI), labor force participation rate, and unemployment rate have an effect on economic growth in East Java Province. This research should enlighten the government and economics practitioners, in addition to being a source of reference for further development of economics research. In addition, the findings of this research are expected to guide policy-making that facilitates human resource quality improvement, employment, and sustainable economic development.

2. Methods

This study employs a descriptive quantitative analysis approach with panel data regression analysis for the last seven years between 2017-2023. The descriptive quantitative approach is employed to describe and explain the nature of the phenomenon under investigation based on collected numerical information. The data are analyzed with descriptive statistical techniques and panel data regression to identify the interaction between the variables under study, identify patterns or trends, and obtain more accurate findings regarding their impacts on economic growth in East Java Province.

This research uses panel data, a combination of cross-sectional and time series data, for 29 regencies and 9 cities in East Java Province, i.e., 38 observational units. Data used in this research are secondary data from official sources such as the Central Bureau of Statistics (BPS) Indonesia and the Central Bureau of Statistics of East Java. The variables analyzed are the Human Development Index (HDI), Labor Force Participation Rate (LFPR), and Open Unemployment Rate (OUR), and how they affect the Economic Growth in East Java Province.

The model of the estimation equation in this study is as follows:

$$Y = \beta_0 + \beta_1 X_{1it} + \beta_2 X_{2it} + \beta_3 X_{3it} + e_{it}$$

Description:

Y	: Economic Growth
β_0	: Constant
β_1- β_3	: Regression Coefficient
X_1	: Human Development Index
X_2	: Labor Force Participation Rate
X_3	: Open Unemployment Rate
e	: Error
i	: Regency/City
t	: Period 2017 – 2023

The panel data regression estimation method can be approached using three models: the Common Effect Model (CEM), the Fixed Effect Model (FEM), and the Random Effect Model (REM). The most appropriate model for panel data management is determined through several tests, including the Chow Test, the Hausman Test, and the Lagrange Multiplier Test. The classical assumptions in this study are designed to explain the variables in the regression model. One advantage of panel data analysis is that it does not necessarily require normality and autocorrelation tests. Therefore, in this study, only multicollinearity and heteroscedasticity tests are applied.

3. Results

Model Estimation Results

In Panel Data Regression testing, there are three regression models: the Common Effect Model (CEM), the Fixed Effect Model (FEM), and the Random Effect Model (REM). The estimation results of these three models are presented in the following table 1:

Table 1. Model Estimation Results

Variable	CEM	P > t	FEM	P > t	REM	P > t
X1	0.2243	0.000	0.4024	0.051	0.2243	0.000
X2	-0.0965	0.061	-0.0198	0.837	-0.0965	0.060
X3	-0.8715	0.000	-1.3823	0.000	-0.8715	0.000
C	-1.6935	0.724	-17.571	0.162	-1.6935	0.723
R-squared	0.1747		0.2404		0.1747	

Source: Statistical Processing Results STATA 17, 2025

The estimation results of the panel regression models using the Common Effect Model (CEM), Fixed Effect Model (FEM), and Random Effect Model (REM) show that the Human Development Index (HDI) has a positive and significant effect on economic growth, with a coefficient of 0.2243 and a p-value of 0.000 in both the CEM and REM models. This confirms that improvements in human capital can drive regional economic output. Conversely, the Labor Force Participation Rate (LFPR) shows a negative effect with a coefficient of -0.0965 and a p-value of approximately 0.060, which is significant at the 10% level, but not significant in the FEM model. This finding indicates that increasing labor participation does not necessarily contribute positively to growth if not accompanied by improvements in job quality. Meanwhile, the Open Unemployment Rate (OUR) consistently shows a strongly negative and significant impact across all models, particularly in the FEM model with a coefficient of -1.3823 and p-value of 0.000. This means that higher unemployment becomes a greater barrier to economic growth due to decreased purchasing power and productivity. The R-squared value in both the CEM and REM models is 0.1747, indicating that approximately 17.47% of the variation in economic growth is explained by the three independent variables. Although the FEM model has a higher R-squared (0.2404), the Chow and Lagrange Multiplier tests indicate that the CEM is the most appropriate model to use. Therefore, this study emphasizes the importance of human development and unemployment reduction as key strategies to drive regional economic growth.

Specification Test

To get the best model, model selection was carried out by Chow Test, Hausman Test, Lagrange Multiplier Test on panel data regression to get the best model in the study.

Chow Test

Table 2. Chow Test Result

Effect Test	Prob.
F(37, 225)	1.04
Prob > F	0.4120

Source: Statistical Processing Results STATA 17, 2025

The Chow Test is conducted to determine the most appropriate model between FEM and CEM which will later be used in estimating the panel data model. In the Chow Test results above, it can be seen that Prob> F is 0.4120 which is more than Alpha 5%. This means that the CEM Model is better than the FEM Model.

Lagrange Multiplier Test

Table 3. Lagrange Multiplier Test Result

Effect Test	**Prob.**
Chibar2 (01)	0.00
Prob > chibar2	1.0000

Source: Statistical Processing Results STATA 17, 2025

The Lagrange Multiplier (LM) test was conducted to determine the most appropriate model between the CEM (Common Effect Model) and REM (Random Effect Model) in estimating the panel data model. Based on the LM test results above, the Prob> chibar2 value is 1.0000, which is greater than α = 5%. This indicates that there are no significant individual effects, so the CEM model is better than the REM model. Therefore, the more appropriate model to use in the analysis is the CEM (Common Effect Model).

Classical Assumption Test

In this study, a Classical Assumption Test was conducted to ensure that the regression model used meets the fundamental assumptions in econometric analysis. Two tests were performed:

Table 4. Multicollinearity Test Result

Variable	VIF	1/VIF
X1	1.54	0.650016
X2	1.46	0.685639
X3	1.13	0.887499
Mean VIF	1.37	

Source: Statistical Processing Results STATA 17, 2025

The multicollinearity test aims to determine whether there is a high correlation between independent variables in the regression model. High multicollinearity can make coefficient estimates unstable and difficult to interpret.

The results of the multicollinearity test can be assessed using the Variance Inflation Factor (VIF). If the VIF value is less than 10, it indicates that multicollinearity is not a concern in the model. Based on the test results, t that the correlation value of each variable (VIF) is not greater than 0.9, indicating that the model does not suffer from multicollinearity issues.

Table 5. Heteroscedasticity Test Result

Test Statistic	Chi2 (9)	Prob > Chi2
White's Test	29.83	0.0005

Source: Statistical Processing Results STATA 17, 2025

The heteroscedasticity test is conducted to determine whether there is an unequal variance in the residuals of the regression model. If the variance of the residuals is not constant, the model experiences heteroscedasticity, which can lead to inefficient estimations.

The test was performed using White's Test, where the results showed chi2(9) = 29.83 with Prob > chi2 = 0.0005. Since the probability value is less than 0.05, it can be concluded that the model exhibits heteroscedasticity.

Hypothesis Test

To address this issue, the regression was conducted using robust standard errors Croux et al., (2004), which provide more reliable estimates even when heteroscedasticity is present in the model.

T-Test

Table 6. T-Test Result

Variable	Coefficient	Std. Error	t-Statistic	P-Value	95% Confidence Interval	
X1	0.2243162	0.034182	6.56	0.000***	0.1570107	0.2916217
X2	-0.096456	0.041783	-2.31	0.022**	-0.17873	-0.0141818
X3	-0.871531	0.124839	-6.98	0.000***	-1.117347	-0.6257152
C	-1.693456	4.084694	-0.41	0.679	-9.736462	6.34955

Note: ***Significant at 1%, **5%, *10% levels.
Source: Statistical Processing Results STATA 17, 2025

Equations formed:

$$Y = -1.693456 + 0.2243162\ X_{1it} - 0.0964557\ X_{2it} - 0.871531\ X_{3it} + e_{it} \quad (1)$$

Table 6. presents the robust t-test results of the regression model's estimated coefficients, standard errors, t-statistics, p-values, and 95% confidence intervals. The robust standard errors are estimated to account for the potential presence of heteroscedasticity to make more credible statistical inferences. The X1 variable positively affects with an estimated coefficient of 0.2243 and a p-value of 0.000, which is significant at 1%. X2 has a coefficient of -0.0965 with a negative and is significant with a p-value of 0.022, which is significant at 5%. X3 also significantly negatively affects with a coefficient of -0.8715 and p-value of 0.000, which is significant at 1%. The constant term (C) is not statistically significant (p-value = 0.679), implying that the intercept is not a significant factor to explain the dependent variable. Overall, the utilization of robust standard errors ensures these findings hold in the existence of any heteroscedasticity in the data.

F-Test

Table 7. F-Test Result

Test	F-Statistic	Prob > F
F-Test	24.40	0.0000

Source: Statistical Processing Results STATA 17, 2025

Table 7. shows that the Prob > F value is 0.0000, which is smaller than 0.05. This means that the F-test results indicate that all independent variables in the model simultaneously have a significant effect on the dependent variable. In other words, the regression model as a whole is statistically significant and can explain variations in the dependent variable.

Determination Test R^2

Table 8. Determination Test (R^2) Result

Test	R-Squared
R-Squared	0.1747

Source: Statistical Processing Results STATA 17, 2025

The results of the determination test in the table show an R-squared value of 0.1747, meaning that 17.47 percent of the variation in the dependent variable GRDP can be explained by the independent variables HDI, LFPR, and OUR. Meanwhile, the remaining 82.53 percent is influenced by other factors outside the model.

4. Discussion

The Effects of Human Development Index (HDI) on Economic Growth

Based on the analysis findings, the present study discovers that HDI has a significant impact on economic growth. This is confirmed by a coefficient of 0.2243 with a p-value of 0.000, which is below the 1% significance level. This shows that an increase in HDI will lead to a significant rise in Economic Growth. Hence, the discovery confirms the first hypothesis presented in this study. The findings of this research show that increased HDI is a significant determinant of increasing economic growth. With improved HDI, it tends to increase growth in Economic Growth. If HDI in the observed regions continues to rise, it will most likely contribute positively to economic growth and prosperity.

This result is in line with actual conditions in East Java, in which areas that have a better Human Development Index (HDI), for example, Surabaya, Sidoarjo, and Malang, are also areas with greater economic growth rates than areas with lower levels of HDI. For example, Surabaya, always at the top of HDI indices like level of education, life expectancy, and per capita income, also thrives in its economic performance with wide contribution from industries, services, and trade sectors. This implies that health, education, and income capability can directly stimulate economic productivity and regional prosperity. Thus, if the attempts to boost HDI in other East Java regencies

persist, the province's general economic growth can be presumed to register the same upward pattern. This observations are in line with (Nur Azizah & Nur Asiyah, 2022; Putri et al., 2023; Rimawan & Aryani, 2019) , where it concluded that HDI has a direct and positive impact on economic growth. Higher HDI normally means that there is higher human capital development, which translates into greater productivity and economic outcomes.

The Impact of Labor Force Participation Rate (LFPR) on Economic Growth

The results of analysis indicate that The Impact of Labor Force Participation Rate (LFPR) is significantly and negatively affects the Economic Growth. This can be demonstrated from a coefficient value of -0.0964 with p = 0.022, which is significant at 5%. This demonstrates the relationship whereby increases in LFPR cause the decline of economic growth. Therefore, the second research hypothesis does not apply. The findings indicate that higher LFPR could be indicative of greater labor force participation but not necessarily improved economic growth. It could be due to the quality of employment, underemployment, or structural labor market imbalances. If LFPR increases without accompanying improvements in job quality, productivity, and economic opportunities, it may not necessarily improve Economic Growth.

This finding is reflected in several regions of East Java where the Labor Force Participation Rate (LFPR) is high, yet economic growth remains moderate or even stagnant. For example, in 2023, districts such as Bangkalan and Sampang showed relatively high LFPR—above 68%—but their Gross Regional Domestic Product (GRDP) per capita remained among the lowest in the province. This condition suggests that although many people are participating in the labor market, the majority may be involved in low-productivity sectors such as informal trade or traditional agriculture, which contribute minimally to economic output. Furthermore, underemployment and limited access to decent jobs remain challenges in these areas. These real conditions support the study's finding that increased LFPR, without improvements in job quality and structural labor market reforms, may not result in proportional economic growth. This discovery supports research of (Pamiati & Woyanti, 2021; Shari & Abubakar, 2022), which also found that the increase in LFPR is not necessarily indicative of economic growth. It highlights the importance of not only increasing labor participation but also of making available jobs productive and helpful to economic performance.

The Effect of Open Unemployment Rate (OUR) on Economic Growth

The examination validates that OUR is a negative and significant factor that impacts Economic Growth since the coefficient = -0.8715 while the p-value is 0.000. Because the p-value is less than 1%, it is correct to confirm that increased OUR is associated with decreased economic growth. This proves the third hypothesis within this study. The results suggest that as OUR rises, the productivity and economic growth rate decreases. Unemployed individuals would be more represented by an increase in OUR. The unemployed have a negative impact on economic growth. Higher unemployment will reduce the family's average income, reduce consumption spending, and lower the growth rate in the economy. As OUR keeps rising, there may be permanent challenges in stabilizing the economy.

This condition can be observed in some districts of East Java that possess relatively high Open Unemployment Rates (OUR), such as Pasuruan City and Probolinggo Regency. According to the data published by BPS East Java in 2023, Pasuruan City experienced an OUR of 7.65%, above provincial average, and its economic growth is inclined to be less rapid than in those regions with lower unemployment, such as Surabaya City. This phenomenon completely shows that growth in OUR has a negative impact on economic growth of household in the region. Unemployment reduces purchasing power of consumers due to lack of money income, which in turn causes consumption to fall and reduce regional economic activity. Furthermore, high unemployment among the working population will increase the cost of society and hamper economic innovation. Sustained growth will render long-term economic recovery more difficult to obtain.

These findings agree with (Kusumawati et al., 2021; Puput Iswandyah Raysharie et al., 2023) who also found that OUR has a negative effect on economic growth. Unemployment at high levels

limits the productive capacity of the economy, reducing overall output and income levels. Fighting unemployment through job creation, training, and diversification of the economy is crucial in economic growth.

5. Conclusion

This study contributes to the literature on regional economic development by empirically examining the influence of the Human Development Index (HDI), Labor Force Participation Rate (LFPR), and Open Unemployment Rate (OUR) on economic growth in East Java Province. As economic growth increasingly intersects with human capital indicators, this research aligns with the state-of-the-art perspective emphasizing inclusive and sustainable development. The study aimed to determine whether HDI, LFPR, and OUR significantly affect regional economic performance as measured by Gross Regional Domestic Product (GRDP). Employing panel data regression over 38 regencies and cities in East Java from 2017 to 2023, the analysis utilized the Common Effect Model (CEM) supported by Chow and Lagrange Multiplier tests. The results revealed that HDI has a significant and positive effect on economic growth, underscoring the pivotal role of education, health, and income in shaping regional productivity. Conversely, LFPR had a significant negative relationship with economic growth, suggesting that high participation without adequate job quality or sectoral absorption may lead to underemployment and economic stagnation. Similarly, OUR was found to significantly and negatively impact economic growth, reaffirming the detrimental consequences of high unemployment on consumption and productivity. These findings imply the need for integrated policy responses that not only raise labor participation but also improve job quality and reduce unemployment. However, the study's explanatory power is relatively modest, with an R-squared value of 17.47%, indicating that other variables outside the model also affect economic growth. The research is limited by its reliance on secondary data and exclusion of qualitative policy dimensions. Nonetheless, it contributes to evidence-based policymaking by emphasizing the importance of human capital and labor market efficiency. Future research should explore sector-specific dynamics and incorporate institutional or spatial factors to enrich understanding of regional growth determinants.

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